

**Report to the Missouri Department of Insurance regarding
Competition in the Medicare Advantage and Individual
Exchange Markets**

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Introduction

I am the Ford Professor of Economics at MIT. I have been studying health insurance markets for more than 20 years and have published more than 100 articles on health care and health care economics. I am the Associate Editor of the Journal of Health Economics, Director of the Health Care Program at the National Bureau of Economic Research, and the President-Elect of the American Society of Health Economists. I received my undergraduate degree in Economics from MIT and a Ph.D. in Economics from Harvard. My CV is attached.

I have been asked by the Missouri Department of Insurance to analyze two issues in connection with its review of the proposed Aetna-Humana merger. The first is the extent of competition between the traditional Medicare program and private Medicare Advantage alternatives for seniors. The second is the role of insurer market concentration on the public health insurance exchanges established by the ACA.

I. Competition Between Traditional Medicare and Medicare Advantage

Seniors in the United States who have sufficient work history are guaranteed insurance coverage under the Medicare program. Traditionally, this implied public insurance coverage through a fee for service system where seniors could go to any physician that they preferred, with the government paying their medical bills. Starting in the early 1980s, however, Medicare enrollees were offered the option of enrolling in private health insurance plans, which received a payment from the government for each beneficiary they enrolled. This program, today known as Medicare Advantage, allows seniors the choice of a managed care plan offered by a number of different private insurers as an alternative to the Traditional Medicare (TM) plan.

Medicare Advantage (MA) plans differ from TM along a number of dimensions. First, they are provided by private (typically for-profit) insurers, rather than the government. Second, they typically provide much broader coverage of the enrollees out of pocket costs for medical care and prescription drugs. Third, they restrict enrollee choice to a more limited set of medical providers. Fourth, they manage care in a more structured way, rather than simply reimbursing providers for the care that patients demand. Finally, the MA plans compete with each other to set their reimbursement rates, subject to a government ceiling.

At the same time, MA plans do not operate in a totally segregated market. Medicare enrollees have a choice at open enrollment of whether to enroll in the FFS or MA plans. While the majority of enrollees choose FFS, a large share choose MA. And there is movement between the two options by seniors.

The question that I discuss in this section of the report is how competitive the FFS and MA segments are with each other. I review the evidence on the interaction between these sectors, and conclude that there is some competition between them, but it is far from complete. In particular, I focus on 4 pieces of evidence from past research that suggest incomplete competition.

The first is the differences in both the fundamental nature of the products offered under TM and MA, and in the health of the patients that choose these products. These are highly differentiated products, with overlapping yet very different types of patients shopping in the two markets. In particular, patients choosing MA plans are much healthier on average than those choosing FFS plans, and it is not clear how effectively MA plans substitute for the FFS option among the sickest Medicare enrollees.

The second is the extent to which higher payments to MA plans are passed on to consumers in the form of reduced premiums or improved benefits. If MA plans are in fact highly competitive with TM,

then when MA plans are paid more they should pass on those benefits to consumers. Yet several recent studies show that this is not the case.

The third is the “natural experiment” provided by the exit of a third participant, Private FFS plans that grew rapidly from 2003 to 2008 but were severely limited thereafter. If MA plans and TM are highly competitive, then the exit of a third market player should not much impact the relative net prices offered by MA plans. Yet a recent study found that when the Private FFS plans exited, MA plans reacted by reducing their out of pocket coverage, which is consistent with exercising market power in an imperfectly competitive market.

Finally, I turn to studies which demonstrate a substantial sensitivity of both pass-through of reimbursement and consumer surplus to the nature of the managed care market. If there was highly effective competition with Medicare, then neither of these should depend critically on the competitive nature of the managed care market in isolation, but in fact they do quite strongly.

Relevant Background on Traditional Medicare and Medicare Advantage

In this section I provide some relevant background on these two options facing seniors. This is not meant to be a comprehensive review of either Traditional Medicare or Medicare Advantage, but rather to highlight the important features of these programs that are relevant for the discussion in this report.

Medicare was established in 1965 as universal coverage for the disabled and elderly. In this report I will focus on the elderly, although many similar issues arise with the disabled as well. Until 2006, the program comprehensively covered medical care but not prescription drugs; prescription drug coverage was added in 2006 under the Medicare Part D option. Medical care coverage includes virtually every medical need from physician to hospital to short term skilled nursing stays. Medical care coverage

is provided by private providers but reimbursed directly by Medicare. In contrast, prescription drug coverage is provided by a series of private insurers from which enrollees can choose.

Since its inception, Medicare has involved fairly significant patient cost sharing. Physician visits are subject to a small deductible but an unlimited 20% co-insurance. Hospital stays are subject to large deductibles. And prescription drug coverage varies across the private insurers that offer coverage, but typically involves sizeable out of pocket costs for patients with high drug bills.

Patients have four options for meeting their high Medicare out of pocket costs. The first is to self-insure the costs. The second is to purchase a private medi-gap supplemental insurance plan, which covers most of the costs (except for a small copayment) in return for a monthly premium. Third, low income Medicare enrollees, the so called "dual eligibles," are covered for these costs through the Medicaid program, which wraps around FFS Medicare to cover almost all of the patient cost sharing.

The fourth option is to enroll in a Medicare alternative provided by private insurers who receive per-beneficiary payments from the government.. Private alternatives to Medicare were introduced in 1982 as Medicare Part C, before being relabeled Medicare+Choice in 1997 and Medicare Advantage in 2003. I refer to these options as Medicare Advantage (MA) throughout this report. Individuals eligible for Medicare have the choice, at an annual open enrollment period, of choosing one of a number of available Medicare Advantage options. While MA plans must cover the services that are included under traditional Medicare, they can also offer supplemental benefits. For example, MA plans typically offer prescription drug coverage, whereas Medicare beneficiaries in TM must pay an additional premium for prescription drug coverage, under the Medicare Part D program. MA plans may also offer vision care and other benefits supplements. MA plans can also cover patient out of pocket costs, which they do to differing levels. They can also differ in the specific type of managed care that they employ. Through 2003, all MA plans were operated as Health Maintenance Organizations (HMOs). Following the 2003 Medicare Modernization Act (the law that introduced prescription drug coverage under Part D),

however, plans could also offer in other forms, including Private Fee for Service plans (which will be the focus of some discussion below).

Payments from the government to Medicare Advantage plans have varied over time in a variety of ways. Throughout their history, MA payments have been based on payment benchmarks which vary by the enrollee's county of residence. Originally, plans received 95% of the county's per enrollee TM spending. Over time, various floors were introduced which raised reimbursement to selected MA plans based on location (urban vs. rural plans). The government also risk adjusts payments to MA plans to attempt to reflect the underlying patient health in these plans; this risk adjustment has become more sophisticated over time. In 2006, the government moved to a bidding system whereby plans could submit a bid for the expected costs of providing Medicare-like services to recipients; if the bids were below the county-level benchmarks, three-quarters of the difference was rebated to consumers in the form of lower premiums or richer benefits, while one-quarter is rebated to the government. The Affordable Care Act kept this system in place, but substantially reduced the county benchmarks, while adding aspects such as bonuses based on plan quality.

Factor 1: Both the Products Offered and the Nature of the Beneficiaries Differs Broadly Between Traditional Medicare and Medicare Advantage

In addressing the competitiveness of TM and MA plans, a natural starting point is to compare the nature of the products and the patients who choose them. This is not dispositive, as products can differ substantially even in highly competitive markets. But competition will nevertheless be a less effective constraint on price the more differentiated are products and their consumer bases.

As should be clear from the description earlier, TM and MA are highly differentiated products. TM does not cover prescription drugs and has sizeable cost-sharing, while MA plans typically include prescription drugs as well as other supplemental benefits, and have much more limited cost sharing.

TM allows free choice of providers with little care management, while MA plans have more limited choice of providers and much stronger care management. TM does not engage in advertising (other than public service advertising to encourage general Medicare enrollment), while MA plans use marketing to attract enrollees to their plans.¹

These differences are reflected in the very different patient populations in these types of plans. A large literature documents that patients who choose Medicare Advantage are much healthier than patients who choose Traditional Medicare, as reviewed by Brown et al. (2014). Past studies show that those who move into MA have costs that are 20-37% lower than those who remain in TM. For example, Batata (2004) examines how TM costs change as more enrollees move into MA. If those moving into MA were, on average, as healthy as those who remain in TM, then when individuals move across programs there should be no change in average TM costs. In fact, however, as more individuals move from TM to MA, average TM costs go up, consistent with the fact that it is the healthiest enrollees moving to MA. Batata finds that the marginal cost of TM disenrollees who move to MA is \$1030 lower, or 20-30% cheaper than the average cost of TM enrollees.

More recently, Brown et al. (2014) show that there are substantial health differences between MA and TM. They find that the health care spending of those switching to MA plans from FFS have total annual health care costs that are \$2,850 (or 45%) lower than those in TM, and have risk scores (measures of underlying patient burden) that are 20-30% lower than in TM. They also find that those who are in good health are more satisfied with MA than with TM. And they find that, among the 3% of MA enrollees who switch back to FFS each year, the sickest enrollees are the ones most likely to switch back. The fact that such switching between TM and MA takes place provides evidence that there is some competition between these sectors. But the differential rates of switching suggest that this may

¹ Indeed, Duggan, Starc and Vabson (2014) find that higher MA plan reimbursement is strongly correlated with higher advertising expenditures.

be a very different decision for sick and healthy MA enrollees, which could place limits on that competition.

Factor #2: Higher Reimbursement of MA Plans is Not Fully Passed on to Consumers

Two recent articles (Cabral, Geruso and Mahoney, 2014; Duggan, Starc and Vabson, 2014) explore an important question around Medicare Advantage: to what extent do higher MA plan payments translate into lower premiums or richer benefits for MA enrollees? As both discuss, under the perfectly competitive model, there should be a full pass through of these payments to enrollees; but with market power, such pass through need not be complete. The two studies focus on different aspects of Medicare reimbursement, and their findings differ in important ways. But both studies find far from complete pass-through, and conclude that the market is not fully competitive.

Both articles lay out a theoretical framework to explain how pass-through of higher MA payments to enrollees reflects the competitive nature of the market. As Cabral, Geruso and Mahoney (2014) show mathematically, the rate of pass through will be less than one only if there is advantageous selection (MA plans enroll the healthiest enrollees and this is not fully compensated by risk adjustment payments) and/or if there is imperfect competition. The first was shown to be true by the previous literature, so both articles attempt to control for that factor in their analysis.

Cabral, Geruso and Mahoney (2014) find that for each dollar of higher payments to MA insurers, enrollee premiums fell by 45 cents and benefits improved by 8 cents, for a total which is much lower than full pass through. Duggan, Starc and Vabson (2014) find that there is no effect of higher reimbursement on enrollee premiums, and that less than 20% of the additional funding is passed through in the form of richer benefits. Duggan et al. also find no impact on patient reported plan quality or satisfaction measures.

Both articles assess the extent to which advantageous selection can explain their results. If there is advantageous selection, then higher reimbursement may bring into plans enrollees that are more expensive than average, raising plan costs and reducing the ability to pass on reimbursement increases to enrollees. Cabral et al. find that such selection can explain at most one-third of the amount that is not shifted to enrollees, while Duggan et al. find no important selection effect.

Both articles argue that their results are therefore consistent with incomplete competition for Medicare enrollees between TM and MA. Duggan et al. show that this incomplete competition resulted in higher benchmarks being used to pay for more advertising. They also show that the stock prices of the plans with the largest presence in the MA market rose significantly at the announcement of higher plan reimbursement rates, which is inconsistent with perfect competition.

Factor #3: Restriction of a Third Market Participant Had Significant Effects on MA

A more precise test of the extent of competition between TM and MA is provided by the study of Pelech (2016). As noted above, one competitor for MA plans are Private FFS plans (PFFS). These plans most closely mimic TM. Originally, unlike MA plans, they did not have to form network or negotiate payment rates with providers. Enrollees could visit any doctor accepting Medicare, and the plans could then pay the doctors based on the Medicare FFS schedule. Essentially, PFFS married the freedom of choice of TM with the more generous benefits structure of MA plans.

Over time, however, concern was raised that PFFS plans were overpaid since they did not have to contract, so that they could pay the relatively low FFS payment rates, yet they received the same benchmark payments as MA plans. In July, 2008, Congress responded to this concern by requiring PFFS plans to form doctor networks. This was a large shock to the organization of PFFS plans, who suddenly had to pay higher rates to providers in order to get them to join their network. The result was a large and immediate reduction in the number of PFFS plans offered. Some of the largest insurers announced

their exit from the market, and many of the PFFS contracts were cancelled over time. By 2011, total enrollment in PFFS plans had fallen by 75%. Most importantly, as Pelech highlights, the impact of PFFS withdrawal varied around the nation based on the ex-ante market share held by these plans.

If TM were a perfect competitor for MA, then the exit of PFFS plans should have had no effect on MA. In that case, MA behavior would have been constrained by their necessity of competing with TM, and whether or not there was a third option would not have had a large effect on their behavior. Pelech finds, however, that the differential exit of PFFS plans had a very large impact on the benefits generosity offered by MA plans: average out-of-pocket costs of MA enrollees rose by \$10.80 per month, which constituted a 20% reduction in average MA generosity relative to traditional Medicare.

Factor #4: Differences in MA Market Structure Have Disproportionate Effects

The final argument is perhaps the most striking. Throughout the nation, TM is the dominant insurer of the elderly. As a result, if there was perfect competition between TM and MA, then changes in MA market structure should have at most a modest impact on the economic outcomes. If differences in the competitiveness of the MA market in isolation have important impacts on the functioning of the MA market, it suggests that this market is partially isolated from TM.

Of course, it is unclear how much TM would constrain MA if they were somewhat, but not perfectly, competitive. But it seems at least that TM would place a fairly hard constraint on MA if there was extensive competition between TM and MA. Throughout the US today, even with historically high MA enrollment, only one state (Minnesota) has an MA market share of more than 50% (53%), while the majority of states have MA market shares below 30%.² In other words, if there were truly complete competition between TM and MA, then a change in the Herfindahl-Hirschman Index (HHI) from movements within MA should have only a modest effect, since the dominant competitor would remain.

² Data from Kaiser Family Foundation at <http://kff.org/medicare/fact-sheet/medicare-advantage/>

But if there are major market responses to changes of the within-MA HHI, it suggests that this is the more relevant HHI for MA plans because they are not fully competing with TM.

In fact, three different studies find that the structure of the MA market itself has very large impacts on the response of MA plans to shocks to the Medicare system. The first is the Cabral, Geruso and Mahoney (2014) study of pass-through discussed above: this study finds a very strong dependence of the amount of pass through on the concentration in the MA market. They divide their sample based on MA market HHI, and they find that pass through is significantly higher in markets with the lowest market power. If Medicare was highly competitive with MA, this would not be expected – the extent of market concentration within MA should not have such a large effect on pass through when the entire MA market remains small relative to TM.

The second is the Pelech (2016) study discussed in the previous section. In that study, Pelech divides the country into five regions based on how competitive the MA market is absent the PFFS plans that are the focus of her study. She finds that the reduction in benefits that resulted from PFFS exit is smallest in the most competitive MA markets, and much larger in the least competitive MA markets; the benefit reduction in the least competitive MA markets was more than 3 times as large as in the most competitive MA markets. Once again, this is a very large amount of variation if there is truly effective competition from Medicare.

The third is an early study by Town and Liu (2003). They focus on the Medicare Advantage (then known as Medicare+Choice) plans in the 1993-2000 era. They estimate a model designed to capture the impacts of these HMO options on consumer welfare. They find that the impact on consumer welfare is positive – consumers are gaining relative to the cost of the managed care plans. But they find that this welfare varies considerably based on the market concentration of managed care plans; consumer surplus “dramatically” increases as the number of plans in the county increases. For example, they find that consumer surplus is 12 times greater in counties with four plans than those with one plan. This

study is from a much earlier era when MA plans were a much smaller share of the market, so once again, if these plans faced strong competition from TM, it seems unlikely that changes in the MA market structure would have such large effects.

Summary

The introduction of managed care alternatives to Traditional Medicare has significantly altered the way that many of our nation's elders receive their Medicare benefits. These alternatives, currently called Medicare Advantage, allow seniors to receive a more comprehensive set of benefits, at lower patient cost-sharing, from a set of competing private insurers. In return these enrollees have access to a more restrictive set of providers, relative to the free choice provided under TM. Clearly, the sizeable and growing share of MA, and the fact that individuals have free annual choice across these options, implies some competition between these options. At the same time, the very differentiated nature of these products implies that there are limits on such competition.

In this report, I have reviewed four types of evidence that suggests limits on the competition between TM and MA. First, not only are the MA products differentiated in their structure, they also enroll a very different set of elders, with MA enrollees being much healthier. Second, when MA plans are reimbursed more highly, they only pass those savings on to consumers in a very limited way, with at most up to one-half of the reimbursement being reflected in lower consumer premiums or richer benefits. Third, when a third market participant exited in the late 2000s, this led to a major reduction in benefit generosity for MA plans. Finally, a number of studies find that the concentration of the MA market has very large effects on pricing, benefits determination, and consumer welfare, despite the fact that the MA market is small relative to TM in most markets.

A full determination of the competitive effect of MA mergers is beyond the scope of this analysis. But the evidence suggests that there is some scope for higher prices or lower benefits to

consumers as the number of MA plans shrinks, despite the competition provided by Traditional Medicare.

II. The Role of Concentration in ACA Health Insurance Exchanges

A separate issue that is relevant to recent merger discussions is the role of insurer market concentration on the public health insurance exchanges established by the ACA. Fewer insurers on the exchanges could reduce competitive pressure which could lead to higher consumer premiums. This issue is the subject of recent research I have undertaken with Leemore Dafny and Chris Ody (Dafny, Gruber and Ody, 2015), which is attached.

As we discuss in that paper (page 61), a number of recent studies show that imperfect competition in various types of health insurance markets in the U.S. lead to higher premiums. For example, the studies reviewed there suggest that more entry in the Medigap market could lower premiums by 21 percent; that a national merger of large insurers in 1999 led to a 7 percent increase in employer-sponsored insurance premiums; and that an insurance merger in Nevada led small group premiums to rise by 14%. We extend this analysis to the context of the health insurance exchanges established by the ACA.

There are a number of reasons to suspect imperfect competition on the exchanges. The first is the presence of a tax credit system under which consumers pay a fixed share of their income, so that they are less sensitive to premium prices on the margin. The second is the highly differentiated product offerings on most exchanges, state and federal; while exchanges are organized by metallic tier in terms of actuarial value, there is substantial heterogeneity in the offerings within tier, making effective shopping difficult. Indeed, my past research with Jason Abaluck (Abaluck and Gruber, 2011, 2015) shows in the context of Medicare Part D that consumers have a difficult time properly deciding on the proper insurance option.

As with Medicare Advantage competing with Traditional Medicare, the insurance offerings on the exchange may compete with the outside individual insurance market. But, even with the limitations noted above, shopping is much more organized on the exchanges than in the outside market, so that it is not easy to compare prices on and off the exchange.

In Dafny, Gruber and Ody (2015) I investigate the question of how insurer competition on the exchanges impacts premiums, at least in the first year of exchange operation. Earlier studies had found that exchange premiums were higher where there were fewer exchange options, but these studies face the potential problem that markets with high premiums may have lower insurance demand for other reasons. To address this shortcoming, our study focuses on the impact of the decision of United Health Care to not offer insurance in 2014 on the entire set of states that operated under the Federal health exchange umbrella (the Federally Facilitated Marketplaces, or FFM).

In particular, we argue that United's decision to not participate in any FFM means that their participation was largely independent of underlying market demand for insurance. We therefore measure the competitive impact of United's decision by their ex-ante share of the individual insurance market: that is, where United was a stronger presence before exchanges (so they would have been expected to be a major player on the exchanges), there was a larger reduction in competitive pressure from their (exogenous) decision to avoid the exchange. Using this approach, we estimate that if United had participated in the exchanges, the premiums on those exchanges would have been 5.4% lower; extrapolating, we estimate that full competition on the exchange from all ex-ante market participants would have led to premiums that were 11.1% lower.

This study has some limitations; for example, it just focused on the first year of exchange operation, and focused on a particular insurer. But the results certainly raise the concern that further consolidation in the insurance market could raise consumer premiums on the exchanges.

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“The Robustness of Tests for Consumer Choice Inconsistencies,” NBER Working Paper #21617, October 2015 (with Jason Abaluck)

“Non-Cognitive Deficits and Young Adult Outcomes: The Long-Run Impacts of a Universal Child Care Program,” NBER Working Paper 21571, September 2015 (with Michael Baker and Kevin Milligan)

“It’s Good to be First: Order Bias in Reading and Citing NBER Working Papers,” NBER Working Paper #21141, May 2015 (with Dan Feenberg, Ina Ganguli, and Patrick Gaule)

“Uncovering Waste in U.S. Healthcare,” NBER Working Paper #21050, March 2015 (with Joseph Doyle and John Graves)

“Prescription Drug Use Under Medicare Part D: A Linear Model of Nonlinear Budget Sets,” NBER Working Paper #20976, February 2015 (with Jason Abaluck and Ashley Swanson)

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MORE INSURERS LOWER PREMIUMS

Evidence from Initial Pricing in the Health Insurance Marketplaces

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ABSTRACT

First-year insurer participation in the Health Insurance Marketplaces (HIMs) established by the Affordable Care Act is limited in many areas of the country. There are 3.9 participants, on (population-weighted) average, in the 395 ratings areas spanning the 34 states with federally facilitated marketplaces (FFMs). Using data on the plans offered in the FFMs, together with predicted market shares for HIM participants (estimated using 2011 insurer-state market shares in the individual insurance market), we study the impact of competition on premiums. We exploit variation in ratings-area-level competition induced by UnitedHealthcare's decision not to participate in any of the FFMs. We estimate that the second-lowest-price silver premium (which is directly linked to federal subsidies) would have decreased by 5.4 percent, on average, had UnitedHealthcare participated. If all insurers active in each state's individual insurance market in 2011 had participated in all ratings areas in that state's HIM, we estimate this key premium would be 11.1% lower and 2014 federal subsidies would be reduced by \$1.7 billion.

KEYWORDS: health insurance, insurance market competition, health insurance exchange, federally facilitated marketplaces

JEL CLASSIFICATION: H51, I11, I18, L1

1. Introduction

The Patient Protection and Affordable Care Act (ACA), passed in March 2010 and upheld by the US Supreme Court in June 2012, introduced dramatic reforms to the health insurance industry. A number of benefit designs were banned, premium variation was limited, and online marketplaces for the purchase of insurance were established in every state. Along with Medicaid expansions and mandates for individuals to purchase and large employers to offer coverage, these marketplaces are a key vehicle for expanding insurance coverage. Federal health insurance subsidies are only available to those who purchase a policy through Health Insurance Marketplaces (HIMs), formerly known as exchanges. HIMs are intended to promote competition along "beneficial" dimensions (such as

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premiums and quality), while at the same time limiting competition along dimensions thought to be socially undesirable (such as selection based on the health of enrollees). Whether the federal health reform affordably expands insurance coverage will depend in no small part on the success of HIMs.

The success of HIMs, in turn, will depend on attracting both consumers and insurers. Competition can only have its salutary effects if there are competitors. Prior to the ACA, health insurance markets were very concentrated. The average state Herfindahl-Hirschman index (HHI) for the individual insurance market was 4,100 in 2011, substantially higher than the Department of Justice's threshold of 2,500 for "highly concentrated."¹ HIMs were designed to lower barriers to entry into the insurance industry. By steering a pool of subsidy-eligible consumers to HIMs and mandating that individuals carry insurance, policy makers hoped to create enough new demand to allow entrants to achieve reasonable scale. HIMs also fulfill the role of "certifying" new entrants, whose plans must satisfy federal standards in order to participate in these regulated marketplaces. This federal stamp of approval serves to increase both consumer and supplier confidence in the quality of entrants, a feat that has proved challenging in recent history. And by displaying products online on a centralized website, HIMs reduce marketing, sales, and administrative costs. In addition, the ACA provided subsidized loans to new, nonprofit insurance co-operatives known as Consumer Operated and Oriented Plans, or CO-OPs.

In spite of these policies, there was limited participation in HIMs during 2014, their first year of operation (and the only year for which data are presently available). In the discussion that follows, we focus exclusively on the 34 federally facilitated marketplaces (FFMs), as our identification strategy and data pertain only to this set of marketplaces. Of the 102 top-three insurers in the 34 FFMs, 55 participated in the relevant state HIM. A number of large national insurers, such as Aetna, Cigna, and Humana, participated in only a limited number of HIMs.² As we discuss in detail below, the nation's largest insurer, UnitedHealthcare (hereafter United), did not participate in *any* of the FFMs. There were some new entrants, however. Across all FFMs, there were 36 new insurer-state "entries," where entry is defined as participation by an insurer that did not offer individual insurance in that state in 2011.³ Of these 36, 13 were CO-OPs.⁴

The combination of concentrated pre-HIM markets, substantial nonparticipation in the HIMs, and limited entry imply highly concentrated marketplaces. Figure 1 gives the

1 Calculated using data from the Center for Consumer Information and Insurance Oversight (CCIIO), described in Section III.

2 Our numbers may not match those reported by the Department of Health and Human Services (or other sources) as we attempted to identify plans offered by the same insurer under different names and link them to a single insurer.

3 Based on 2011 data, 33 of these 36 had not previously offered individual insurance in any FFM state. Most "entrants" to the individual market are insurers who previously provided Medicaid managed care in a given state.

4 There are 13 new, federally sponsored CO-OPs operating in 13 of the 34 FFMs. In 2014, each CO-OP operated in only one state, with three exceptions. First, "CO OPortunity Health" operates in both Iowa and Nebraska. Second, "Health CO OPerative SCW" and "Common Ground Healthcare CO OPerative" operate in Wisconsin.

FIGURE 1. Few insurers in many markets



Notes: $N = 395$. Histogram reflects population-weighted share of markets.

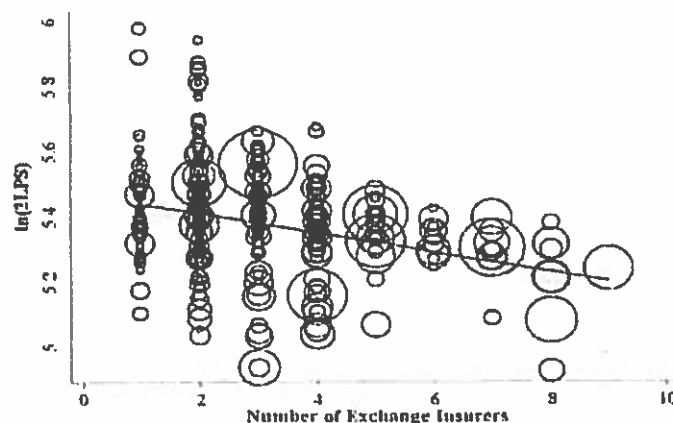
population-weighted distribution of insurers across the 395 federally delineated ratings areas in the 34 FFM states. Ratings areas are state-defined regions across which insurers may vary price and participation.⁵ Seven percent of the population lives in areas with only one insurance option, and about half live in areas with three or fewer options. On a population-weighted basis, there are on average 3.9 insurers per market, with 2.9 incumbents (i.e., insurers who are not new to the individual market), 0.3 CO-OP entrants, and 0.7 non-CO-OP entrants.

In this study, we explore the effect of insurer participation in HIMs on 2014 premiums. Prior empirical research finds that insurer consolidation has led to higher premiums for large employer-sponsored plans (Dafny, Duggan, and Ramanarayanan 2012) and fully insured, small-group plans (Guardado, Emmons, and Kane 2013). The degree and nature of competition, and hence the quantitative relationship between market structure and premiums, may be different in the HIMs.⁶ On one hand, HIMs standardize some plan features and facilitate plan comparisons, creating a more Bertrand-like pricing

5 According to the Department of Health and Human Services, ratings areas “overlap with the issuer service areas in many, but not all, cases. In general, the number of issuers or plans available in a rating area will be the number of choices available to all individuals and families living in that rating area. Issuers are not required to offer a qualified health plan in every rating area within a state, however, so the number of available issuers and qualified health plans varies by rating area.” (US Department of Health and Human Services 2013). Thus, ratings areas are natural market definitions for insurance offered through exchanges.

6 There are a number of additional reasons why extrapolating from Dafny, Duggan, and Ramanarayanan (2012) to our scenario is difficult. For example, they study the large-group market, and the initial level of concentration in these markets during their study period is significantly lower.

FIGURE 2. More insurers means lower premiums



Notes: Scatter plot reflects 395 ratings areas, with circle sizes corresponding to population. Figure also contains weighted regression line and 95 percent shaded confidence interval.

environment. If these design features enable this competitive ideal, markups can be low in markets with as few as two insurers. On the other hand, the transparent display of non-standardized plan features (e.g., provider networks) and (eventually) plan quality may spur product differentiation, higher markups, and potentially higher average premiums. In addition, the existence of subsidies may dampen the price elasticity of some buyers, tempering the relationship between competition and price (and implying more competitors are needed, *ceteris paribus*, to generate competitive outcomes).

Our empirical work focuses on the premium for the second-lowest-priced silver plan within a market. We refer to this premium as *2LPS*. Federal subsidies are linked to the *2LPS*, and past evidence suggests that the lower tail of the premium distribution may be particularly important to consumers (Ericson and Starc 2012a). The *2LPS* exhibits a substantial amount of variation nationally: among FFMs, the 90th percentile of *2LPS* is 45% higher than the 10th percentile.

Existing cross-sectional analyses suggest that HIMs with more insurers have lower premiums.⁷ Figure 2 illustrates that HIMs with more participants generally have lower *2LPS*. The graph shows the distribution of *2LPS* by the number of HIM participants, along with a fitted line from a univariate regression; while there is substantial variation around the line, the slope is negative (correlation coefficient = -0.35).

This fact admits many interpretations. For example, insurers may prefer to participate in geographic markets where medical costs are lower. To mitigate such endogeneity concerns, we exploit United's decision to uniformly avoid all 34 FFMs as a source of quasi-experimental variation in *ex post* marketplace concentration. United's nonparticipation differentially affected the competitive environment across markets, owing to its pre-ACA

7 See, for example, http://aspe.hhs.gov/health/reports/2013/Marketplace/premiums/ib_marketplace_premiums.cfm

premium and product characteristics as well as the participation decisions, premiums, and product characteristics of rivals. It is also a policy-relevant source of variation, as insurers similar to United are likely marginal nonparticipants: if expected profits for insurers increase, large insurers who shunned the HIMS are likely to enter.

We construct a measure of the change in market concentration resulting from United's decision to avoid FFMs. We then model *2LPS* across ratings areas as a function of this measure. We find that premiums are highest in markets where United's participation would have most reduced concentration. Our findings are robust to a wide variety of specification checks.

We estimate that the population-weighted average *2LPS* would have been 5.4 percent lower had United entered all markets in the FFMs. If all insurers present in a state's individual market in 2011 had entered the FFMs, we estimate that the weighted average *2LPS* in the FFMs would have been 11.1 percent lower. We also find that *2LPS* is lower in markets with CO-OPs, although we caution against a causal interpretation of this association due to the potential endogeneity of CO-OP locations.

These results suggest that additional competitors can have a large impact on premiums and federal subsidies for HIM plans. Spiro and Gruber (2013) estimate that each 1 percent reduction in *2LPS* reduces federal subsidies by 1.25 percent. Back-of-the-envelope calculations imply that attracting all incumbents to insurance markets would save an estimated \$1.7 billion in federal subsidies in 2014, and \$105.2 billion over the 2014–23 ten-year horizon, under the (admittedly strong) assumptions that our findings are generalizable to state-based HIMS and that market structures do not change.

The remainder of the paper proceeds as follows. Section II provides background on the health insurance marketplaces, United's nonparticipation decision, and prior research on competition among health insurers. Section III describes the construction of our data set and discusses summary statistics. Section IV presents the main analysis. Section V provides a falsification check of the results by examining the relationship between pre-HIM individual market premiums and the instrument for HIM HHI. We also discuss robustness of the findings to alternative specifications. Section VI concludes.

II. Background

A. HEALTH INSURANCE MARKETPLACES

HIMs are regulated online marketplaces for the purchase of health insurance. In this paper, we study HIMs for individual policies.⁸ The ACA gave states three options with respect to the development of their HIMs: (1) design and manage their own (so-called "state-based" marketplaces)—selected by 16 states and DC; (2) let the federal government design and operate the marketplace—selected by 27 states; (3) pursue a hybrid approach ("state–federal partnership" marketplace)—selected by 7 states. Options (2) and (3)

8 HIMs for small group policies exist—and are known by the acronym SHOP for the Small Health Options Program—but as of this writing they do not yet comply with many requirements included in the ACA. Premium and other data on SHOP plans are not readily available.

together comprise the federally facilitated marketplaces (FFMs). All HIMs became available as of October 1, 2013, for individuals to purchase coverage effective in January 2014.

The broad design of an HIM is the same in every state. Five tiers of products are offered. The first tier consists of "catastrophic" high-deductible plans offered primarily to those under age 30.⁹ The four remaining tiers are categorized by "actuarial value" (AV), defined as the share of health-care spending that an insurance plan pays for a typical enrollee. These tiers are identified by precious metals (AV thresholds): bronze (0.6); silver (0.7); gold (0.8); and platinum (0.9). The ACA requires all products sold on or off the HIMs in the individual and small-group markets to conform to one of these tiers. In addition, all plans in these markets must satisfy federal standards regarding "essential health benefits." Essential health benefits include coverage of a specified set of services, restrictions on benefits limitations (such as annual spending limits), and a maximum out-of-pocket exposure for enrollees of \$6,350 (single)/\$12,700 (family).

Subject to this standardization, insurers have wide latitude to design their products in almost all states. For example, insurers may adjust features of patient out-of-pocket costs in any way that satisfies the AV standard for a plan's metal tier. Insurers can offer any plan design that is within 2 percent of the actuarial-value target, as long as essential benefits are covered. Insurers may also compete on network design, subject to broad restrictions on network adequacy. The resulting variation across plans is meaningful. On the pre-ACA Massachusetts exchange, which standardized benefits to a greater degree than required by the ACA, the most expensive plan within a standardized benefits tier (and for a specific zip code-age combination) was 50 percent more expensive than the cheapest plan (Ericson and Starc 2013).

Plans on the HIMs set their own premiums. While there is no explicit premium regulation, there is regulation on the plan Medical Loss Ratio (MLR), the ratio of medical benefits paid out to premiums collected. MLRs must exceed 80 percent in the individual and small-group market and 85 percent in the large-group market, which places limits on the ability of firms to make large profits. In addition, premiums are community-rated, varying only by ratings area, family composition, tobacco use, and age, with a maximum 3:1 ratio of the premiums for the oldest:youngest enrollee.

All plans on an HIM must successfully complete the HIM's "plan certification process." The process is uniform across FFMs and is described through public announcements by the Centers for Medicare and Medicaid Services.¹⁰ Each plan must be certified as "qualified health plan" (QHP) in the relevant state. QHPs must satisfy a set of standards regarding licensure, service areas, network adequacy, and patient safety. They must also undergo a review of rates. States may review QHP applications and provide recommendations to CMS regarding certification.

Individuals in the HIMs will in most cases be purchasing insurance products using a federal tax subsidy. The ACA provides that households with income between 100 percent

9 The catastrophic plan is also available to individuals who do not have the option to purchase insurance below the mandate affordability threshold of 8 percent of income.

10 For 2015, this notice is available at <http://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/2015-final-issuer-letter-3-14-2014.pdf>.

and 400 percent of the federal poverty line may access tax credits to offset some of their premiums. These tax credits offset the difference between premiums and a sliding-scale percentage of income, beginning at 2 percent of income for households with income equal to 100 percent of the poverty line and rising to 9.5 percent of income between 300 percent and 400 percent of the poverty line. In some states, a federally funded Medicaid expansion covers all those below 133 percent of the poverty line, so HIM participation starts at that higher level; in states without Medicaid expansions, eligibility for HIM subsidies begins at 100 percent of the poverty line. An estimated 4.8 million individuals have income below the federal poverty line and are ineligible for subsidies and Medicaid.¹¹

B. UNITED'S NONPARTICIPATION

A standard difficulty with any study assessing the impact of market concentration on price is the endogeneity of market participation and market shares. In this setting, one concern with regressing HIM premiums on market concentration arises from the possibility that participation decisions (whether by incumbents or de novo entrants) may have been affected by expectations about market premiums. Many of the large national insurers, such as Aetna, Humana, and Cigna, selectively entered the HIMs. For example, Aetna entered 16 of 34 FFM's.¹²

One exception is United, the nation's largest commercial insurer. Once a mid-size regional insurer, United now has a national footprint, achieved largely through acquisitions.¹³ Its market share varies widely across states, with no consistent geographic pattern. In the individual insurance market, these shares range from less than 1 percent in Montana, North and South Dakota, New Hampshire, Maine, and Utah to over 20 percent in South Carolina, Missouri, West Virginia, and Arizona.

The variation in United's pre-HIM market position implies that its blanket nonparticipation decision (discussed below) differentially affected the competitive landscape of each market. United's decision not to enter could affect *2LPS* through two mechanisms: (1) a "direct effect" arising from the possibility that United could have offered one of the two lowest-priced silver plans in a given market; and/or (2) an "indirect effect" due to rivals' strategically lowering their premiums to compete with United. We expect both effects to be larger in areas where United would have been a more significant competitor on the HIMs. In areas where United had higher pre-HIM market share in the individual insurance market, we can infer that its combination of premium and product attributes was relatively attractive. Thus, its decision to stay out of the market ought to have softened competition more considerably in these markets (the indirect effect). If United's premium

11 Source: "The Coverage Gap: Uninsured Poor Adults in States that Do Not Expand Medicaid," *Kaiser Family Foundation Issue Brief*, March 2014. <http://kaiserfamilyfoundation.files.wordpress.com/2014/04/8505-the-coverage-gap-uninsured-poor-adults-in-states-that-do-not-expand-medicaid.pdf>.

12 These entry decisions are nonrandom. For example, Aetna's pre-exchange individual market share (per 2011 CCIIO data, described below) was more than twice as high in the markets it entered as compared to those it did not. Note that Aetna participates on seven exchanges using the Aetna brand name. In most other exchanges, it offers plans under the brand name of Coventry, which it acquired in 2013.

13 Major plan acquisitions in the past decade include Oxford and Mid Atlantic Medical Services (MAMS) in 2004, PacifiCare in 2005, Sierra in 2008, and parts of HealthNet in 2009.

tended to be on the low side in these markets as well, all else equal we would also expect the direct effect to be larger in these areas. Our data on pre-HIM individual market premiums (described in Section III below) confirm that United's relative rates are lower in states in which they have a larger presence.¹⁴

Note that if United's decision not to participate in a market provoked others who would not otherwise have participated to do so—and if this is particularly likely where United had high pre-HIM share because the market opportunity is more substantial—then our estimated effects will be downward-biased. Given the long application process associated with participating in the first-generation FFMs, we believe this bias is likely to be small. For the same reason, the indirect effect may also be low in the first year of the HIM operations, as rivals may not have had ample time to adjust their premiums in light of United's nonparticipation decision.

Figure 3 depicts a timeline for insurers' applications and submissions to HIMs, along with pertinent public statements United made about their participation plans. Per the Centers for Medicare and Medicaid Services (CMS), insurers had to submit their plan designs by the end of March 2013 and premiums by May 3.¹⁵ However, there was likely some flexibility to adjust premiums after that deadline, as Kathleen Sebelius, secretary of the Department of Health and Human Services (which oversees CMS), stated in late June that rates were not yet finalized.¹⁶

The first public proclamation of limited participation by United appeared in January 2013, when the *Wall Street Journal* reported that United was "expected to participate in 10 to 25 . . . marketplaces . . . out of . . . 100."¹⁷ As this total incorporates the small-business HIMs (SHOPs), the implication is that United was expected to participate in 5–13 individual HIMs (out of the 51 HIMs, one in each state as well as Washington, DC). The article further quotes United's CEO as stating, "[United's] level of interest in exchanges will be driven by how we assess each local market—how the exchange and rules are set up state by state." This statement foreshadows United's blanket decision to stay out of all the FFMs, which had uniform regulations. It is therefore possible that some insurers accurately predicted United's nonparticipation in at least some states at this time.

On April 18, 2013, a couple of weeks before HHS's May 3 Initial Qualified Health Plan Submission Deadline, United's CEO reiterated: "We will be very selective. . . . [We] do not believe exchanges will be a significant factor . . . in our 2014 commercial market outlook." Given this statement occurred after the "participation deadline" of March 31 and before premiums were finalized, this later announcement could have influenced pricing (the indirect effect). Note, however, that even if rivals did not attempt to predict and incorporate

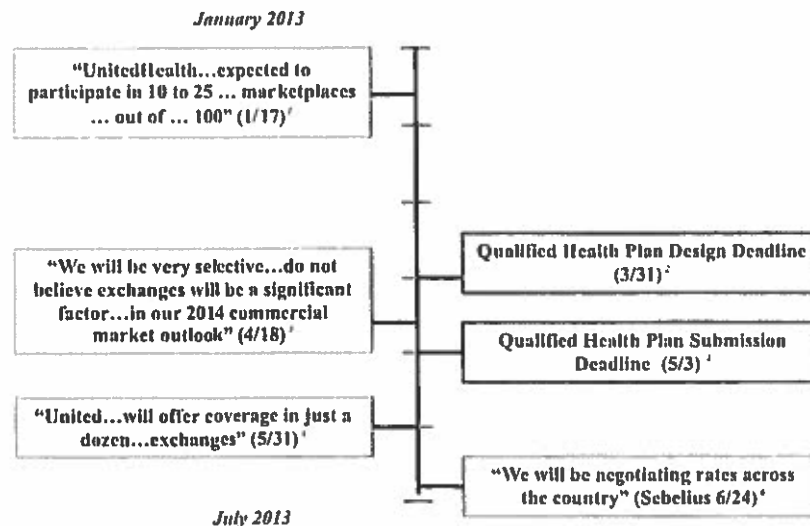
14 Specifically, United's relative price position (as measured by where its premium per member falls in the within state premium distribution) was lower in states where it had greater pre exchange share.

15 <http://www.cms.gov/CCIIO/Resources/Fact-Sheets-and-FAQs/Downloads/marketplace-timeline-narrative.pdf>.

16 Sebelius asserted, "We will be negotiating rates across the country." While HHS lacks the authority to "actively negotiate" with plans (i.e., exclude plans if their rates are too high), HHS may have had other levers to negotiate with insurers, and insurers would likely have been free to revise premiums downward at this point. <http://kaiserhealthnews.org/news/sebelius-administration-is-negotiating-rates-in-federal-exchanges/>.

17 <http://online.wsj.com/news/articles/SB10001424127887324468104578247332079234240>.

FIGURE 3. Could United have affected rivals' pricing?



Notes: ¹<http://online.wsj.com/news/articles/SB10001424127887324468104578247332079234240>.

²<http://www.healthreformgps.org/resources/cms-extends-qhp-application-deadline/>.

³<http://www.lifehealthpro.com/2013/04/18/unitedhealth-to-be-very-selective-exchange-user>.

⁴<http://www.cms.gov/CCIIO/Resources/Fact-Sheets-and-FAQs/Downloads/marketplace-timeline-narrative.pdf>.

⁵<http://www.bloomberg.com/news/2013-05-30/unitedhealth-spurs-obama-exchanges-as-rules-stall-profit.html>.

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United's decisions into their pricing decisions, the direct effect would still operate as a mechanism to lower premiums.

C. PRIOR RESEARCH

C.1. INSURANCE MARKET COMPETITION. This study builds on existing research on competition among private insurers. A number of recent studies show that imperfect competition in various US health insurance markets leads to higher premiums. These include Starc (2014) for the Medigap market, Ericson and Starc (2012b) for the Massachusetts health insurance exchange, Dafny, Duggan, and Ramanarayanan (2012) for the large employer market, and Guardado, Emmons, and Kane (2013) for the fully insured, small-employer market. Starc predicts that entry of a single additional large insurer would reduce the enrollment-weighted Medigap premium by 21 percent and expand the market by 50 percent. Ericson and Starc build a model of consumer demand using enrollment

data from the Massachusetts health insurance exchange and simulate optimal insurer pricing under alternative competitive scenarios. They find that pricing exceeds the levels predicted under perfect competition. Dafny, Duggan, and Ramanarayanan (2012) quantify the impact of market concentration (as measured by HHI) on premium growth in the large-group segment, instrumenting for concentration using the predicted change in local market HHI generated by a large, national merger in 1999. This merger had varying impacts on local markets owing to differences in the market shares and geographic overlap of the merging firms. They estimate premiums in the average market were approximately 7 percentage points higher by 2007 due to increases in local concentration between 1998 and 2006. Finally, Guardado, Emmons, and Kane (2013) use data on small-group premiums at the Metropolitan Statistical Area (MSA) carrier level to study the impact of a 2008 merger between Nevada's first and third-largest insurance carriers, United and Sierra Health Services. As compared to plans in control MSAs (matched to the treatment MSAs using propensity scores), metropolitan areas affected by the merger experienced premium increases of 13.7 percent.

Our instrument is similar in spirit to that used by Dafny, Duggan, and Ramanarayanan (2012). We exploit variation in the local impact of United's national nonparticipation decision to identify the effect of exchange market concentration on premiums. Whereas Dafny, Duggan, and Ramanarayanan (2012) study the effect of HHI on premium growth, we have only one year of data and hence focus on premium levels. Our point estimates are roughly one-third the size of those reported by Dafny, Duggan, and Ramanarayanan (2012). Because their estimate captures the cumulative impact of changes in HHI over time, it is unsurprising that we find a smaller single-year effect.

C.2. EXCHANGE RESEARCH. As HIMs are a recent phenomenon, there is a limited amount of relevant prior research. We briefly discuss the literature on the three most direct predecessors to HIMs: the Massachusetts Connector exchange, Medicare Advantage, and Medicare Part D.

There are a number of recent papers examining the Massachusetts Health Connector, an exchange established by the 2006 health-care reforms in Massachusetts. In a series of papers, Ericson and Starc study (1) how changes in the degree of plan standardization required by the exchange affected consumer choice, plans offered, and pricing (Ericson and Starc 2013), (2) what types of plans consumers choose (20 percent select the cheapest option; Ericson and Starc 2012a), and (3) the interaction between age-specific consumer price elasticities, imperfect competition, and modified community rating (Ericson and Starc 2012b). Hackmann, Kolstad, and Kowalski (2013) report that average costs and premiums per insured individual in Massachusetts decreased following the imposition of the mandate to carry insurance coverage, confirming adverse selection into the state's individual insurance market prior to 2006.

Another predecessor of HIMs is the market for privately provided Medicare plans, known today as "Medicare Advantage." Like HIMs, competition among plans can affect prices and subsidies. Unlike HIMs, market participants compete against traditional Medicare, and often use the same provider reimbursement rates as traditional Medicare. Medicare Advantage premiums (after subsidies, which all Medicare eligible enjoy) cannot fall below zero. In addition, profit margins are restricted. Thus, plans may provide

beneficiaries with additional benefits beyond those offered in traditional Medicare. Of greatest relevance to our work, a growing body of evidence suggests that Medicare Advantage markets are imperfectly competitive, with a large share of increases in government subsidies accruing to providers, rather than being competed away through more generous enrollee benefits. (See, for example, Song, Landrum, and Chernew 2012; Song, Landrum, and Chernew 2013; Cabral, Geruso, and Mahoney 2013; and Duggan, Starc, and Vabson 2014.)

There is a substantial and growing body of literature on Medicare Part D, a marketplace with many similarities to the HIMs. In both settings, the government subsidizes purchases and creates rules to manage how competition among firms takes place. This literature focuses heavily on whether enrollees make good choices, how limitations in consumer decision-making affect firm behavior, and how alternative choice architecture could improve consumer welfare. (See, for example, Abaluck and Gruber 2011, 2013; Ericson 2014; Ketcham et al. 2012; Kling et al. 2012; Lucarelli, Prince, and Simon 2012; Zhou and Zhang 2012; and Heiss et al. 2012.) Overall, the Medicare Part D literature suggests that even with robust entry, poor optimization by enrollees mitigates the salutary effects of competition.

III. Data and Methodology

We draw on a number of sources to create a data set of plans offered in the 395 ratings areas (across 34 FFMs), along with measures of ratings-area-level market structure and local health spending. Because United's nonparticipation decision was uniform only across FFMs, we limit attention to these. We also construct a data set of enrollment and premiums at various units of geography, depending on the source.

A. KEY DEPENDENT AND INDEPENDENT VARIABLES

Data on plans were downloaded from the healthcare.gov website.¹⁸ The plan data contains insurer identifiers, plan metal tier, ratings areas in which a plan is offered, and premiums for a 27-year-old. Our key dependent variable, *2LPS*, is the premium for the second-lowest-price silver plan in a ratings area. Plan premiums for other ages and family structures are a constant percentage of the 27-year-old single premium.¹⁹

We focus on the *2LPS* for two reasons. First, federal subsidies are linked to the *2LPS* in each "ratings area," the geographic market utilized on the HIMs. More specifically, subsidies are set so that *2LPS* minus the subsidy is no more than x percent of income, where x ranges between 2 and 9.5 and increases with income as described in Section II. Those with household incomes above 400 percent of the federal poverty line are not eligible for subsidies. Recently released enrollment data from the FFMs shows that 85 percent of enrollees in 2014 received government subsidies.²⁰ The Congressional Budget Office projects that 76 percent of HIM enrollees in 2020 will receive subsidies, accounting for \$93 billion of

18 Source: <https://www.healthcare.gov/health-plan-information>.

19 States had the opportunity to design their own state-specific age curves for defining how premiums would vary by age. None in our sample did so.

20 <http://aspc.hhs.gov/health/reports/2014/MarketPlaceEnrollment/Apr2014/excel/workbook.xls>.

the \$197 billion estimated cost of ACA's coverage expansions.²¹ Thus, *2LPS* is a key driver of the overall costs of the ACA.

Second, there is evidence that the lower segment of the premium distribution is particularly important to consumers. As noted above, Ericson and Starc (2012a) report that a substantial number of consumers who purchased insurance on the Massachusetts exchange in 2007–09 selected the least expensive plan. In 2014, 65 percent of FFM enrollees chose a silver plan, and 20 percent chose bronze plans.²² More pragmatically, given the number of plans, and our inability to judge which of these will prove relevant in each marketplace, a measure like the mean or median is less informative. For completeness, however, we also report results using such measures.

Our key independent variable for measuring competition is *HHI*, a predicted Herfindahl-Hirschman index. Because the market is new, we must predict market shares in order to compute a predicted HHI. To do so, we match insurers appearing in the FFM data with state-insurer enrollment data (in the individual insurance market) for 2011. These data are collected and reported by the Center for Consumer Information and Insurance Oversight (CCIIO) for the purpose of enforcing the MLR regulations.

For insurer *i* in ratings area *m*, we define *share_{im}* as its share among those insurers who are active within that ratings area in the exchange, under the assumption that insurers split the market proportionally to their ex ante (i.e., 2011) state shares. Based on the limited empirical evidence available, it appears that pre-exchange shares are highly correlated with exchange shares.²³ This methodology gives new entrants a share of zero. (In Section V.B., we discuss the robustness of our results to alternative share allocations for entrants.) Denoting the set of insurers in market *m* as *I_m*, we construct $HHI_m = \sum_{i \in I_m} share_{im}$.

Next, we construct ΔHHI , the change in HHI resulting from United's nonparticipation. The predicted share of each insurer had United entered the market is denoted $share_{im}^U$, and the predicted HHI is HHI_m^U . United's share had it entered the FFMs is $share_{UHCm}^U$. Note that for all insurers other than United, $share_{im} = \frac{share_{im}^U}{1 - share_{UHCm}^U}$. The increase in HHI from United's nonparticipation can then be expressed as

$$\Delta HHI_m = HHI_m - HHI_m^U \quad (1);$$

$$\Delta HHI_m = \sum_{i \in I_m} \left(\frac{share_{im}^U}{1 - share_{UHCm}^U} \right)^2 - \left(\sum_{i \in I_m} (share_{im}^U)^2 + (share_{UHCm}^U)^2 \right) \quad (2).$$

21 http://www.cbo.gov/sites/default/files/cbofiles/attachments/45231-ACA_Estimates.pdf.

22 Ibid. 15 percent chose catastrophic, gold, or platinum plans.

23 Emerging evidence on exchange enrollment suggests that pre-exchange shares are good indicators of exchange shares. The *Huffington Post* collected enrollment data for eight states (CA, CT, MA, MN, NV, NY, RI, WA). Using their reported data (which excludes some small players) for states other than MA (which had an exchange prior to 2011), we calculated predicted exchange market shares using 2011 CCIIO data (and excluding United). Insurers that entered in 2014 but were not present in 2011 are assigned a share of 0 in 2011. Insurers present in 2011 but not participating in the exchanges are excluded. The correlation between our predicted shares and the actual 2014 shares was 0.63. (Data source: http://www.huffingtonpost.com/2014/01/27/health-insurance-obamacare_n.4661164.html.)

The effect of increasing United's share on ΔHHI_m is

$$\frac{\partial \Delta HHI_m}{\partial share_{UHCm}^U} = 2[HHI_m - share_{UHCm}^U HHI_m - share_{UHCm}^U] \quad (3).$$

This expression shows that, theoretically, United's nonparticipation has a nonmonotonic effect on ΔHHI . If United is very large and its competitors are all small, ΔHHI will decrease in $share_{UHCm}^U$ and can even become negative. As a practical matter, ΔHHI in our data is almost always increasing in United's share, and is only negative for one observation. We censor this observation at zero in our main results; dropping it has little impact on the findings.

An alternative to ΔHHI is United's pre-exchange share. The advantage of using HHI is that it captures the relative importance of United's rivals; a 10 percent United share matters more in a market with just one rival ($\Delta HHI = 1,800$) than in a market with, say, three equally sized rivals (each with pre-exchange market share of 30 percent, yielding $\Delta HHI = 533$). As a robustness check, however, we also examine results using United's pre-exchange share in place of ΔHHI .

B. ADDITIONAL CONTROLS

We supplement our data set with a number of controls that may affect health-care costs, insurance preferences, or the competitive environment in a ratings area. The first of these measures is *hospital price*, constructed using 2007–09 hospital-level data from the Centers for Medicare and Medicaid Services' Healthcare Cost Report Information System (HCRIS) data set.²⁴ Hospitals account for roughly one-third of spending by private insurance plans, hence hospital prices are a significant determinant of premiums. We follow the methodology in Dafny (2009), which calculates price as the net inpatient revenue per case-mix adjusted, non-Medicare admission.²⁵ Although it would be preferable to exclude Medicaid admissions from this price measure, as hospitals are paid largely fixed rates for these patients, the HCRIS data on Medicaid revenues are exceedingly noisy.

Per Dafny and Ramanarayanan (2012), nonprofits with significant market share charge lower premiums, *ceteris paribus*, than for-profits. We control for this by including the expected market share of nonprofit insurers, *share NFP*, using the same methodology to assign shares that we used to calculate *HHI*. We account separately for the presence of a nonprofit CO-OP using a dummy variable (which varies at the ratings-area level).²⁶ Both *share NFP* and *CO-OP* are likely to be endogenous. However, the similarity of the

24 Cost Report estimates for hospital prices shift from year to year. For example, the non-Medicare admission-weighted correlation in prices for facilities in 2007 and 2009 is 0.73. We therefore pool three years (deflating to a common year using the CPI) to improve the precision of our estimates.

25 We use each hospital's Medicare Case-Mix Index (CMI) to adjust for admissions severity; non-Medicare CMI is not reported. Critical Access Hospitals and other hospitals not paid under Medicare's Prospective Payment System are excluded from the sample.

26 Our methodology assigns zero share to entrants, hence the need for a separate variable. In addition, nonprofit CO-OPs are of independent interest as they are new entrants partially funded by government loans.

results with and without controls tempers concerns that their inclusion biases the effect of interest (i.e., how competition affects price).

Last, we include a parsimonious set of demographic controls in our main specification: *per capita income* for 2011 from the Bureau of Economic Analysis, and *percent black* and *percent Hispanic* from Census data. Although we considered many other demographic controls (such as *percent diabetic* and *percent uninsured*) and market-level controls (such as area hospital market concentration), and (as discussed in Section V.B. below) the key results are robust to inclusion of these controls, we did not retain them in our preferred specification for two reasons. First, the coefficient estimates display classic signs of multicollinearity, and second, multiple demographic controls absorb degrees of freedom that are particularly scarce in our falsification tests, which rely on state and MSA-level data.

Notably, we present estimates excluding all controls to illustrate their impact on the results. All regressions are weighted using the 2011 ratings-area population estimates as weights.²⁷

C. ADDRESSING LIMITATIONS OF THE INSTRUMENTAL VARIABLES APPROACH

To satisfy the exclusion restriction, our instrument must be correlated with predicted exchange HHI, but uncorrelated with other determinants of premiums.²⁸ There are two primary mechanisms by which this assumption could be violated. First, United's market share may itself capture underlying market conditions in a way that is reflected in premiums. For example, United may be able to compete more effectively in high-cost insurance markets where its ability to negotiate tough deals with providers can be most valuable. To address this concern, we use pre-HIM data to show that there is no preexisting correlation between the instrument and insurance premiums.

Ideally, we would like to have a measure of pre-exchange premiums for individual policies at the ratings-area level. Unfortunately, these data do not exist. Therefore, we consider four distinct alternatives, each with strengths and limitations. We construct two measures of premiums from the 2011 Medical Expenditure Panel Survey Insurance Component (MEPS-IC). The first is the average estimated single enrollee (as opposed to family) premium for private-sector establishments.²⁹ The MEPS-IC publishes these data for

27 The coefficients of interest are smaller, but remain statistically significant in unweighted models.

28 A sufficient condition for United's nonentry to be an exogenous decision is for it to have been driven by United having a particularly high fixed cost to entering any FFMs. If, by contrast, United's nonparticipation was driven by price shocks that were unobserved to the econometrician, then the fact that United chose not to enter but that Aetna, Cigna, and Humana did enter in some markets should lead us to update our priors about prices in markets in which United had been dominant. Note that this source of endogeneity biases our estimates downward; that is, if United shunned all of the FFMs because of negative profit shocks to the markets in which it was likely to be dominant, then we would expect lower prices in markets that had been United heavy. To test for this possibility, we confirmed that our results are robust to excluding the states in which United had the most enrollees (i.e., larger states in which United had had a presence, like Texas, Florida, and Michigan).

29 The MEPS reports raw premiums without any case-mix adjustment.

large MSAs and state “residuals” (i.e., non-MSA areas). Therefore, the strength of this measure is that it is available at a relatively fine level of geography; our 34 states contain 79 MEPS-IC markets.³⁰ However, employer premiums are imperfectly correlated with individual-market premiums—in spite of the fact that both reflect local market cost and utilization trends—limiting the value of evidence that employer premiums are uncorrelated with ΔHHI (the falsification exercise).³¹ Hence, we also present results using the average estimated single enrollee premium for small employers only, which is more closely linked to the individual market.³² The limitation of this second measure is that it is only available at the state level, owing to MEPS-IC confidentiality restrictions.

Our third measure of pre-exchange premiums is the average 2011 individual market premium by state, as reported by CCIIO. (This source is also used to calculate our pre-exchange market shares, as described above.) This average premium is available for the most relevant market segment (the individual market), but only at the state level. The fourth and final measure of premiums comes from the Large Employer Health Insurance Dataset (LEHID) for 2009, the most recent year for which we have these data. LEHID is a proprietary data set containing information on the health insurance plans (and associated premiums) offered by a sample of very large employers. The details of these data, as well as their comparability with other sources, are discussed in Dafny (2010). LEHID's main strengths are that it is available at a relatively disaggregated level of geography (our 34 states contain 98 LEHID markets),³³ and that it includes a rich set of variables we can use to control for plan and employee characteristics. However, the data are older and reflect an even more distant market segment from the individual market than the MEPS-IC all-employer sample.³⁴

A second concern with our identifying assumption is that variation in ΔHHI comes not only from variation across states in United's individual insurance market share, but also from the decisions of other insurers to participate on the HIMs in each ratings area. This arises from the fact that United's predicted share for each ratings area is defined as

30 MSAs and ratings areas do not perfectly match. We assign each ratings area to the MSA with the highest share of the ratings area's population. We follow the same procedure for assigning ratings areas to LEHID markets.

31 Most employer-sponsored plans are self-insured, whereas all individual plans are fully insured. Self- and fully insured plans are subject to different regulations and premium taxes, and market participants may differ across the two segments. For more details, see Dafny, Duggan, and Ramanarayanan (2012). The correlation between state-level employer premiums and small-employer premiums in the MEPS is 0.61.

32 Most small-group plans are fully insured, and therefore subject to the same regulations as individual policies. In addition, state-level regulations regarding community rating (when present) are often the same for individuals and small groups.

33 There are 139 geographic markets defined by LEHID. Most reflect metropolitan areas or nonmetropolitan areas within the same state (e.g., Chicago, Northern Illinois except Chicago, Southern Illinois), although a few cross state boundaries.

34 To improve the precision of our estimates for ΔHHI , we pool LEHID data from 2007–09 and include both self- and fully insured enrollees when constructing insurer shares. When constructing LEHID premiums, we use only 2009 and only fully insured enrollees, as the fully insured segment is more similar to the individual market than the self-insured segment. The falsification results are not sensitive to this decision.

the ratio of its state-level share to the sum of state-level shares of all insurers participating on the exchange in that ratings area. The advantage of defining ΔHHI in this way (rather than using all insurers' pre-exchange state-level shares) is that it provides a more accurate estimate of United's likely market share in a ratings area. Some insurers are not active in all areas of a state, and this is likely a principal driver of their decision not to participate on the HIMS in these areas. The disadvantage is that participation may also depend on unobserved factors correlated with exchange premiums. For example, more insurers may wish to participate in areas where HIMS are likely to attract healthy enrollees, generating a spurious negative correlation between premiums and concentration. To the extent that these confounding factors vary at the state level, state fixed effects will address this concern. In Section V.B., we confirm that the reduced-form coefficient of interest is indeed robust to inclusion of state fixed effects.³⁵

We also construct a measure of ΔHHI that mitigates concerns about the endogeneity of within-state insurer participation decisions; this is accomplished by constructing insurer shares using purely ex ante data (i.e., not conditioning upon which incumbent individual market insurers actually offered plans in a given market). We cannot rely on the CCIIO state-level data, as doing so would result in only 34 unique values for ΔHHI (and correspondingly noisy estimates). The MEPS-IC cannot be readily used to calculate insurer market shares, as there is no data field identifying the insurance carrier for each plan. Hence, we utilize the LEHID data (which, as previously noted, reflect the large-group market) and data from InterStudy, a proprietary source of insurer enrollment data by MSA.³⁶ For both sources, we limit the data to fully insured private insurance plans.³⁷ The LEHID data yield 98 unique market observations, and the InterStudy data contain 79 MSAs.

D. SUMMARY STATISTICS

Table 1 presents population-weighted summary statistics for the 395 ratings areas ("exchange markets") in FFM states. Exchange markets are highly concentrated: the average number of insurers per market is only 3.9. Predicted HHIs are correspondingly very high, with an average of 7,323, much greater than the DOJ/FTC threshold of 2,500 for "very concentrated." We caution that these HHIs are overstated because our methodology does not allocate share to entrants (who do not appear in the CCIIO data). Nearly 30 percent of people live in markets with one to two insurers, and half live in markets with three

35 Our preferred specifications do not include state fixed effects, however, as these absorb a significant amount of the variation in ΔHHI .

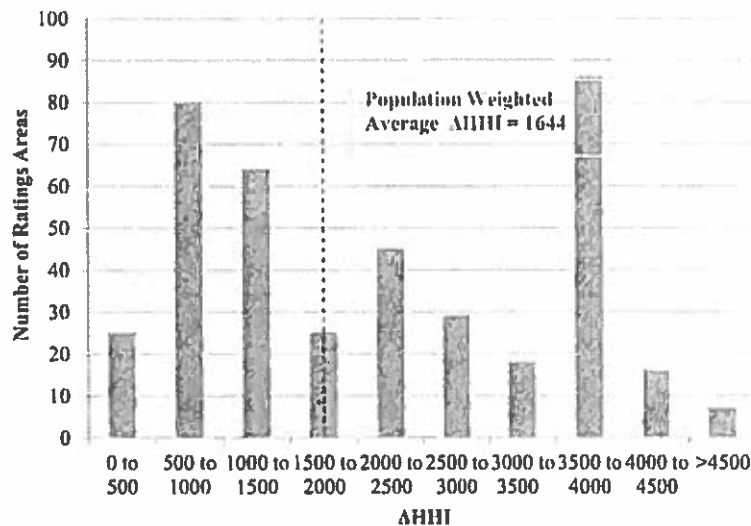
36 We attempted to create additional observations for "state residuals." However, most states have MSAs that cross state boundaries, making it impossible to infer market shares for state residuals. Adding in the state residuals for which this is not a problem does not substantively change the results.

37 The InterStudy data also contain enrollment for self-insured plans and commercial Medicaid. We examined whether the results are robust to (1) including the self-insured lives, and (2) including Medicaid lives and adding a separate control for Medicaid's share of covered lives. In both cases, the main results remain qualitatively similar, but the coefficient on ΔHHI ceases to be significant at conventional levels.

TABLE 1. Summary statistics for federally facilitated marketplaces

Variable	Mean	Std. dev.	Min	Max
Number of insurers	3.9	2.0	1	9
Number of plans	50.9	29.6	7	169
Number of silver plans	17.2	10.3	2	48
Price of second-lowest-price silver plan (2LPS)	21.4	37	138	395
Under 65 population	443,830	759,394	7,391	7,612,795
Income per capita (\$)	39,519	7,176	19,049	65,173
Hospital price (\$)	6,597	1,392	3,447	11,906
CO-OP present on exchange	0.33	0.47	0.00	1.00
Share nonprofit	0.61	0.38	0.00	1.00
Percent black	0.16	0.12	0.00	0.75
Percent Hispanic	0.15	0.15	0.01	0.96
United market share (if participating in exchange)	0.16	0.12	0.00	0.98
<u>Predicted exchange HHI (United is not participating)</u>				
HHI	0.73	0.20	0.32	1.00
<u>Predicted exchange HHI (if United were participating)</u>				
HHI _{plus United}	0.57	0.17	0.24	0.99
<u>Implied ΔHHI</u>				
Δ HHI	0.16	0.11	0.00	0.49

Notes: $N = 395$. The unit of observation is the ratings area. There are 395 ratings areas in the 34 states with federally facilitated marketplaces. Price for the second-lowest-price silver plan is the individual premium for a 27-year-old. Premiums move proportionally with age. Hospital price is defined as net revenue per case-mix adjusted discharge, excluding Medicare revenues and discharges, per Dafny (2009). It is constructed using Medicare's HCIRIS database. For each ratings area, we use the discharge-weighted average of prices for hospitals located in the area. Share nonprofit is constructed using the 2011 individual insurance market shares of nonprofit insurers participating in the exchange, as reported by CMS' Center for Consumer Information and Insurance Oversight (CCIIO). Summary statistics for variables other than population are reported on a population-weighted basis.

FIGURE 4. Predicted impact of United's decision

Note: $N = 395$.

or fewer insurers.³⁸ Despite the relatively small number of insurers, most ratings areas feature a large number of plans: the mean is 50.9 (including all metal tiers), and 17.2 for silver plans only. The predicted share of nonprofit insurers averages 61 percent. One in three markets contains a CO-OP.

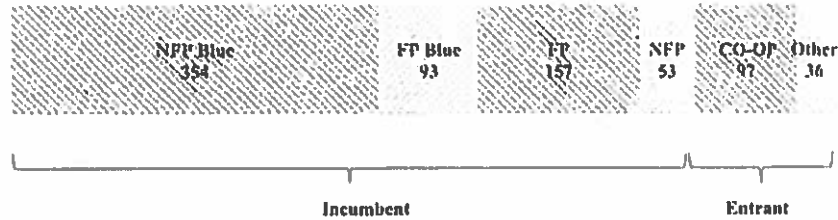
Figure 4 is a histogram depicting the number of ratings areas with different ranges of ΔHHI . The figure reveals that the predicted impact of United on market concentration is large and varies significantly across markets. The population-weighted mean of ΔHHI is 1,644, which is similar in magnitude to the change in HHI that would result from a transition from three to two evenly sized firms.

Figure 5 presents information on the identities of the firms that offer one of the two lowest silver premiums in exchange markets. The Blues offer the plurality of low-premium exchange plans (57 percent), which is unsurprising given their high market shares in pre-exchange individual insurance, low premiums, and near-universal participation in HIMs.³⁹ As a first hint that CO-OPs are associated with lower *2LPS*, we find they are often represented in the bottom two. Significantly, for-profit incumbents (i.e., firms like United) offered 20 percent of these low-priced plans.

38 Because more populous markets tend to have more competitors, the average market is less competitive than the population-weighted numbers suggest. The unweighted average number of insurers and HHI are 2.8 and 8,320, respectively.

39 Dafny and Ramnarayanan (2012) find evidence suggesting the largest nonprofit Blues have lower premiums than comparably sized for-profit Blues.

FIGURE 5. Identity of 1st and 2nd lowest-priced silver insurers, by category



Note: $N = 790$.

IV. The Relationship between Market Structure and Prices

A. ARE PRICES CORRELATED WITH MARKET STRUCTURE?

We begin by examining whether $2LPS$ is correlated with our endogenous measure of competition. More specifically, we estimate the following equation using data at the ratings-area level:

$$\ln(2LPS)_m = \beta HHI_m + X_m \lambda + \varepsilon_m \quad (4)$$

HHI_m is our estimate of market competition and X_m is a vector of optional controls, specifically $\ln(hospital\ price)$, $\ln(per\ capita\ income)$, *share NFP*, *CO-OP*, *percent black*, and *percent Hispanic*. All observations are weighted by the 2011 ratings-area population. Results from this endogenous regression are presented in the first two columns of Table 2. The first column excludes the control variables, while the second column includes them. In both specifications, greater concentration is positively and significantly correlated with $2LPS$. The results imply a one-standard-deviation decrease in HHI (equal to 0.2, per Table 1, which is slightly larger than the mean decrease in HHI that would result if United entered all ratings areas) is associated with a reduction in $2LPS$ of 5.6–7.2 percent. Of course, given the endogeneity concerns raised above, we are hesitant to place a causal interpretation on the findings.

B. DOES COMPETITION HAVE A CAUSAL EFFECT ON PREMIUMS?

Next, we investigate whether competition has a causal effect on premiums. We posit that United's decision not to participate in any of the FMs is a source of plausibly exogenous variation in exchange market structure. We use ΔHHI_m , as defined in Section III.A., to instrument for HHI_m . In the following three subsections, we (1) confirm that ΔHHI_m is correlated with HHI_m ; (2) show that ΔHHI_m is correlated with $2LPS$; and (3) estimate equation 4 using ΔHHI_m as an instrument for HHI_m .

B.1. FIRST-STAGE MODEL. To evaluate whether ΔHHI_m is indeed predictive of changes in HHI_m , we estimate the following model:

$$HHI_m = \beta \Delta HHI_m + X_m \lambda + \varepsilon_m \quad (5)$$

TABLE 2. Main results

	Endogenous regression		First stage		Reduced form		Instrumental variables	
	Dep var = ln(2LPS)		Dep var = HHI		Dep var = ln(2LPS)		Dep var = ln(2LPS)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HHI	0.274 ^a (0.040)	0.348 ^a (0.041)					0.260 ^a (0.079)	0.336 ^a (0.083)
Δ HHI			0.954 ^a (0.081)	0.871 ^a (0.079)	0.248 ^a (0.079)	0.293 ^a (0.078)		
ln(per capita income)		0.058 (0.045)		-0.138 ^a (0.049)		0.009 (0.048)		0.055 (0.048)
ln(hospital price)		0.183 ^a (0.038)		-0.011 (0.041)		0.179 ^a (0.041)		0.183 ^a (0.038)
CO-OP in market		-0.086 ^a (0.017)		0.022 (0.019)		-0.078 ^a (0.019)		-0.085 ^a (0.018)
Share nonprofit		-0.077 ^a (0.022)		0.157 ^a (0.023)		-0.023 (0.023)		-0.075 ^a (0.024)
Percent black		0.156 ^b (0.064)		0.241 ^a (0.069)		0.240 ^a (0.068)		0.159 ^b (0.066)
Percent Hispanic		-0.087 ^c (0.052)		-0.281 ^a (0.055)		-0.186 ^a (0.054)		-0.091 (0.056)
R ²	0.105	0.290	0.259	0.398	0.025	0.185	0.105	0.289

Notes: $N = 395$. All regressions are weighted by the ratings-area population under 65, as reported by the US Census. The instrument for HHI is Δ HHI. Standard errors in parentheses. ^a $p < 0.01$,

^b $p < 0.05$, ^c $p < 0.10$.

Results are presented in the third and fourth columns of Table 2, first excluding and then including the controls described above. Across both specifications, changes in ΔHHI_m translate into HHI_m nearly one for one, and the coefficient estimates are highly statistically significant. A number of the controls, such as income, racial composition, and *share NFP*, are significant predictors of *HHI*.

B.2. REDUCED FORM. The reduced-form model relates exchange premiums to the instrument, that is,

$$\ln(2LPS_m) = \beta \Delta HHI_m [+X_m \lambda] + \varepsilon_m \quad (6).$$

The results, presented in the fifth and sixth columns of Table 2, imply that premiums are higher in markets where United's nonparticipation has a larger effect on predicted market competition. For example, in a market with the median weighted ΔHHI_m , we predict

2LPS would have been 3.6 percent lower.⁴⁰ The remaining variables enter with the expected signs. We discuss them further in the following section.

B.3. INSTRUMENTAL VARIABLES. Finally, we estimate the IV regression

$$\ln(2LPS_m) = \beta HHI_m + X_m\lambda + \epsilon_m \quad (7),$$

instrumenting for HHI_m with ΔHHI_m . The results, presented in the final two columns of Table 2, suggest a meaningful impact of United's nonparticipation on premiums. Given the first-stage coefficient estimates are close to 1, the coefficients are very similar in magnitude to the reduced-form estimates in the adjacent columns. The results are also fairly similar to the OLS results from the first two columns, potentially mitigating endogeneity concerns with the OLS results.

To gauge the magnitude of the results, we examine how premiums would change under two scenarios: (1) United enters all FFM ratings areas; and (2) all incumbent insurers enter all FFM ratings areas in the states in which they offered individual insurance in 2011. Using the coefficient in column 8 (the specification with controls) as our central estimate, we calculate that population-weighted 2LPS would have been 5.4 percent lower under scenario (1) and 11.1 percent lower under scenario (2). We caution that the latter estimate requires making projections far out of sample, where the assumption of a linear effect of changes in HHI is less likely to be valid.

The estimate for the effect of CO-OP on premiums is of independent policy interest. 2LPS is 8.1 percent lower in markets with CO-OPs; however, as we discuss in Section V.B. below, CO-OP location may be endogenous. The coefficients on the remaining controls enter with plausible signs and magnitudes. A 1 percent increase in inpatient hospital prices is associated with a ~0.2 percent increase in insurance premiums. This is the same proportion of private health-care expenditures attributable to inpatient care for privately insured, nonelderly patients.⁴¹

Our reduced-form estimates combine the "direct" and "indirect" effects previously described. To gauge the plausibility of our combined estimate and to attempt to disentangle the two, we performed two different exercises. As a first exercise, we simulated the effects of adding a randomly selected participant (from the set of all participants, in all ratings areas) as an "entrant" into each ratings area. We normalized the entrant's premiums to account for differences in the mean and variance of premiums across states, and we repeated the exercise 1,000 times to obtain average effects and standard errors. Details are provided in the Online Appendix (www.mitpressjournals.org/doi/Suppl/10.1162/ajhe.a.00003). The results suggest that adding a randomly selected entrant to all markets reduces the weighted-average 2LPS by 4.5 percent, on average. As a second exercise, we removed each of the three largest FFM participants from the data and recalculated 2LPS. Arguably, these insurers are the closest analogs to United. The resulting increases in 2LPS

40 Using the estimate of 0.293 from column 6 (the specification with controls), together with the median weighted ΔHHI_m of 0.12, yields $\exp(0.293 \times 0.12) = 1.036$.

41 Figure is from Health Care Cost Institute (2013).

averaged 4.5 percent.⁴² Overall, these results suggest that the magnitudes we obtain are sensible, and that the premium increases we estimate could be driven entirely by the direct effect.

V. Robustness

A. FALSIFICATION EXERCISE

As noted earlier, there are potential concerns about the endogeneity of our instrument. In this section, we present a series of falsification tests designed to examine those concerns.

Our first test documents that ΔHHI is uncorrelated with preperiod premiums, which should allay concerns that the share of the market held by United is correlated with omitted determinants of exchange premiums. Preperiod premium data do not exist at the ratings-area level. We therefore use several sources of premium data, some available at the state level, some at roughly the MSA (and MSA residual) level, and one at the LEHID market level. Given the higher level of aggregation (relative to the ratings area), our statistical tests will have lower power, making it harder to reject the null of no correlation between ΔHHI and preperiod premiums. Hence, we compare the results from these regressions with those obtained from estimating our primary reduced-form regression (equation 6) using the same geographical market definitions. Table 3 presents these results. To increase the comparability of estimates across different dependent and independent variables, we standardize both the dependent and independent variables (by subtracting the mean and dividing by the standard deviation). All specifications are weighted and include the set of controls from prior models.

Column 1 presents results using MEPS MSA-level data on premiums for employer-sponsored plans. Specification 1 (i.e., the top specification) examines whether our reduced-form relationship between $2LPS$ and ΔHHI from column 6 of Table 2 is present when the data are aggregated to the MSA level. The point estimate is smaller than our estimate from the ratings-area data (i.e., 0.194 vs. 0.336), and statistically significant at $p < 0.10$. In contrast, specification 2 (i.e., the bottom specification) contains no evidence of a statistically significant relationship between MEPS employer premiums in the preperiod and ΔHHI . The point estimate is near zero, albeit with large standard errors. The difference between the coefficient estimates in specifications 1 and 2 is not statistically significant at conventional levels.

Columns 2 and 3 repeat the same analysis using state-level preperiod premium data; as discussed above, both the MEPS small-employer premium data and the CCHO individual insurance data are only available at the state level. Given the high level of aggregation, it is unsurprising that the coefficients from specification 1 (while very similar in magnitude

42 Removing Aetna (which participated primarily through its Coventry brand, which offers Medicaid HMOs) from the calculation of $2LPS$ results in a weighted-average increase in $2LPS$ (across the markets in which it participated) of 2.5 percent. Removing Humana or Wellpoint (separately) increases weighted-average $2LPS$ by 5.9 and 5.2 percent, respectively. A simple average across these estimates is 4.5 percent. We caution that the specific market participation decisions of these insurers appear to be endogenous (see footnote 13), hence this exercise is largely descriptive.

TABLE 3. Reduced-form falsification exercise

	(1)	(2)	(3)	(4)	(5)	(6)
Source of pre-period premiums	MEPS, all firms	MEPS, small firms	CCIO	LEHID	LEHID	N/A
Source of Δ HHI	CCIO	CCIO	CCIO	CCIO	LEHID	InterStudy
<i>Specification 1 (confirmation that main results persist):</i>						
<i>Dep Var = $\ln(2LPS)$, studentized ΔHHI (studentized)</i>	0.194 ^c (0.113)	0.174 (0.180)	0.174 (0.180)	0.188 ^c (0.101)	0.179 (0.170)	0.149 ^c (0.089)
<i>Specification 2 (falsification):</i>						
<i>Dep Var = $\ln(\text{pre-period premiums})$, studentized ΔHHI (studentized)</i>	0.029 (0.113)	0.011 (0.147)	0.039 (0.159)	0.018 (0.061)	-0.033 (0.104)	
Number of observations	79	34	34	98	98	248
Unit of observation	MSA	State	State	LEHID market	LEHID market	Ratings area
p-value for H_0 : identical effect of independent variable on both dependent variables	0.30	0.48	0.58	0.16	0.30	

Notes: All regressions are weighted by the ratings-area population under 65, as reported by the US Census. MEPS MSA definitions break states into MSAs and state residuals (i.e., areas outside the MSAs). All specifications include the controls in the even columns in Table 2. Regressions with a LEHID dependent variable also control for plan type shares, plan design factor, and demographic factor. The standard errors in column 6 are clustered at the MSA level (196 clusters). Standard errors in parentheses. ^a $p < 0.01$, ^b $p < 0.05$, ^c $p < 0.10$.

to that in column 1) are not statistically significant at conventional levels in either column 2 or column 3. For both dependent variables, the coefficient estimates from specification 2 are near zero, although with 34 observations our standard errors are quite large and two-sided tests of coefficient equality easily accept the null.

Column 4 repeats the analysis again using LEHID market definitions and premiums. The LEHID specifications include controls for the underlying plan and enrollee characteristics. These include *plan design factor*, which reflects the actuarial value of observed plans in the relevant market, and *demographic factor*, a summary measure capturing characteristics of the insured LEHID population (e.g., family size and gender).⁴³

The point estimate in specification 1 is again two-thirds as large as our central estimate and remains significant at $p < 0.10$. The coefficient estimate on ΔHHI in specification 2 is again near zero; there is no evidence that ΔHHI is significantly correlated with preperiod LEHID premiums. Here, the coefficients from specifications 1 and 2 are distinguishable at $p = 0.16$.

The other major concern raised above was our instrument conditions on insurers who choose to participate in state HIMS. To address this point, we turn to the LEHID and InterStudy data sets, which allow us to construct measures of ΔHHI using purely ex ante estimates of market share. Column 4 replaces only the dependent variable with premiums calculated from LEHID, and utilizes the LEHID market as the unit of observation. Column 5 also replaces ΔHHI with a LEHID-based version that uses pre-exchange market shares for all incumbents. The point estimates for specification 1 are virtually the same as those reported in columns 1–4, although the standard error is larger in column 5. In specification 2, there is no evidence that ΔHHI is correlated with preperiod LEHID premiums.

Finally, the last column of Table 3 uses ΔHHI constructed from InterStudy MSA market shares for all employers. We are only able to estimate specification 1, as we lack InterStudy premium data. The coefficient estimate is similar in magnitude to the other columns and statistically significant at $p < 0.10$.

In summary, there is some evidence (albeit weaker and noisier) that ΔHHI is correlated with $2LPS$ even when the data are aggregated to higher levels of geography. By contrast, there is no evidence that ΔHHI is correlated with pre-exchange premiums: the point estimates in the falsification exercises in specification 2 are always near zero. However, the coefficients from the exchange and pre-exchange periods are not statistically distinguishable from one another. We also find that substituting our version of ΔHHI with a measure that does not depend on incumbents' exchange participation decisions has little impact on the reduced-form point estimates.

B. ROBUSTNESS CHECKS

Table 4 presents results of our reduced-form equation using other measures of premiums: the mean premium across all silver plans offered in a ratings area; the median premium

43 We also include the market level shares of plan types (Indemnity, Preferred Provider Organization, Health Maintenance Organization, and Point of Service), as well as the share of plans denoted as "consumer-directed" (i.e., high-deductible plans).

TABLE 4. Reduced-form effect of ΔHHI on $\ln(\text{prices})$ [robustness to alternative measures of prices]

	(1)	(2)	(3)	(4)
	Dep var = $\ln(2LPS)$	Dep var = $\ln(\text{meanpremium})$	Dep var = $\ln(\text{medianpremium})$	Dep var = $\ln(\text{meanof within-insurermean premiums})$
ΔHHI	0.293 ^a (0.079)	0.162 ^a (0.057)	0.182 ^a (0.062)	0.175 ^a (0.055)
$\ln(\text{per capita income})$	-0.013 (0.053)	0.058 (0.038)	0.097 ^b (0.041)	0.061 ^c (0.037)
$\ln(\text{hospital price})$	0.197 ^a (0.043)	0.169 ^a (0.031)	0.151 ^a (0.033)	0.161 ^a (0.030)
CO-OP in market	-0.079 ^a (0.019)	-0.009 (0.014)	-0.002 (0.015)	0.000 (0.013)
Share nonprofit	-0.018 (0.024)	-0.032 ^c (0.017)	-0.051 ^a (0.019)	-0.018 (0.017)
Percent black	0.260 ^a (0.070)	0.175 ^a (0.050)	0.218 ^a (0.055)	0.105 ^b (0.049)
Percent Hispanic	-0.187 ^a (0.054)	0.070 ^c (0.039)	0.131 ^a (0.042)	0.049 (0.038)
R^2	0.190	0.173	0.185	0.160

Notes: $N = 383$. All regressions are weighted by the ratings-area population under 65, as reported by the US Census. Samples exclude Virginia, which has very large pricing outliers. When Virginia is included, specifications utilizing a mean premium (i.e., columns 2 and 4) yield statistically insignificant coefficients on ΔHHI . Standard errors in parentheses. ^a $p < 0.01$, ^b $p < 0.05$, ^c $p < 0.10$.

across the silver plans; and the mean of within-insurer mean silver premium (i.e., a mean calculated using one observation per insurer, so as to avoid overweighting insurers with many plans). For this analysis, we exclude the state of Virginia, which has some extreme premium outliers.⁴⁴ The first column presents the results obtained using this sample and our primary dependent variable, *2LPS*. Our conclusions are robust to using these other dependent variables. The point estimates are somewhat smaller, but the differences across specifications are not statistically significant. There are a number of possible causes for the smaller estimated magnitudes obtained using these alternative premium measures.

First, the alternative premium measures have smaller standard deviations than *2LPS*, suggesting that there is less variation to explain. Second, some of the variation in *2LPS* is related to the sheer number of plans offered in a ratings area. Even if plan premiums are in expectation the same (e.g., drawn at random from the same distribution of prices), adding

44 Three Virginia insurers (Optima, Aetna, and Innovation Health) have premiums that are extreme outliers. The mean silver premium (for a 27-year-old) across these three insurers is 885. This compares to a mean of 256 for the rest of the country.

more plans will lower *2LPS* without affecting many other measures of premiums. Third, the coefficients could be interpreted as evidence that the effect of stronger competition is particularly great for plans in the low-priced silver segment. Finally, one may also infer that United's larger impact on *2LPS* implies it has a greater direct than indirect impact on exchange premiums.

Table 4 also shows that CO-OPs are significantly related to *2LPS*, but not to other measures of premiums. We take this, along with the relatively large share (in Figure 5) of markets in which CO-OPs are among the two lowest-price firms, as suggestive evidence that CO-OPs are decreasing *2LPS* more through the direct effect (i.e., by being one of the two lowest-price firms in the market) than indirect effect (i.e., they may not—in the first year—have inspired competitors to reduce their premiums.) Due to the potential endogeneity of CO-OP locations, and the lack of an instrument for their presence, the CO-OP results are merely suggestive. Additional research on the impact of CO-OPs would be valuable, as the budget compromise of January 2013 eliminated funding to support prospective CO-OPs and slashed funds for current CO-OPs.⁴⁵

Our results are robust to a series of other specification choices. In Online Appendix Table 1, we present reduced-form results from models including several additional controls (measured at the ratings-area level, except where otherwise noted), share of the population located in an urban area, share obese, share diabetic, whether a state is expanding Medicaid, share aged less than 19, share uninsured, Medicare fee-for-service spending per capita (to capture variation in utilization of health-care services), hospital market concentration, and 2011 state MLRs. Variable construction and sources are described in the notes to Online Appendix Table 1. Adding these additional controls has a minimal impact on the coefficients of interest. In Online Appendix Table 2, we present results from a series of other specification choices: (1) excluding HMs with five or more insurers; (2) adding dummies for number of exchange insurers; (3) excluding the top and bottom 5 percent of Δ HHI; (4) excluding the top and bottom 5 percent of *2LPS*; (5) allocating entrants 5 percent share; and (6) including state fixed effects. The point estimates for the effect of Δ HHI on *2LPS* range from 0.151 to 0.669, with most remaining near 0.3 and all statistically significant at the 5 percent level. Finally, we also estimate a reduced-form model replacing Δ HIII with United's pre-exchange market share. This alternative instrument is also a significant predictor of *2LPS* (with $p < 0.01$), but the implied effect of United's presence on *2LPS* is smaller. The smaller estimated effect is expected given that share is a less accurate indicator of United's effect on market competition than predicted change in HHI.

VI. Conclusion

In this study, we evaluate the impact of insurer participation and competition in the FPMs on premiums. We find that exchange premiums are responsive to competition. To

45 By December 2012, the federal government had awarded \$2 billion in loans, out of \$6 billion initially set aside by ACA. In January 2013, Congress eliminated all but about \$200 million of the remaining funds, and this sum was designated to support the 24 CO-OPs already existing at that time. Thirteen of these CO-OPs offered plans in 2014. Source: James (2013), "Health Policy Brief: The CO-OP Health Insurance Program."

contend with the endogeneity of exchange market structure, we exploit the decision by United to forgo participation in the FFM. This decision differentially impacted markets due to United's pre-exchange market position.

We estimate that the population-weighted average second-lowest silver premium would have been reduced by 5.4 percent had United entered all markets. If all insurers present in a state had entered all ratings areas in that state's exchange, we predict FFM premiums would have been 11.1 percent lower. We also find that markets with CO-OPs have lower premiums. A portion of this association is attributable to a "direct effect" because CO-OPs are often among the two lowest-price silver plans in a market; their premiums directly lowered the weighted average *2LPS* by 2.1 percent.⁴⁶

The magnitude of the relationship between HHI and exchange premiums is roughly one-third that obtained by Dafny, Duggan, and Ramanarayanan (2012) for the large-employer-group market. Although the estimates are not perfectly comparable (in particular, the Dafny, Duggan, and Ramanarayanan (2012) estimate reflects the cumulative effect of changes in HHI on premium growth over a few years' time), the similar order of magnitude suggests that the competitive dynamic characterizing early exchange markets is akin to that of the mature, but imperfectly competitive, large-group market. This suggests that HIMs have not (to date) produced a Bertrand-like outcome in which a small number of players can drive premiums down to cost.

Future entry, firm learning, consumer learning, and greater plan standardization may change this assessment. There is room for significant learning on both sides of this market. For example, over time consumers are likely to learn how to better compare different plan attributes, like premiums, actuarial value and network design. Tools to facilitate these comparisons and to help consumers prioritize attributes will also improve. Changes in the shapes of consumer demand curves will in turn affect pricing. Relatedly, insurers' uncertainty about who their competitors will be, what the pool of consumers will look like, and what kinds of products will be attractive to those consumers will resolve. While impossible to sign definitively, most of these forces are likely to make the cross-price elasticities of demand across insurers higher for a given market structure. Under these circumstances, margins will decline faster with a move from one to two insurers. Once pricing nears the competitive level, however, additional competitors will have a smaller incremental effect.

Given the incipency of these markets, this study is but a first step in what will surely become a deeper and broader literature on insurance HIMs and the nature and significance of competition among exchange participants. There is substantial room for further research on how competition affects pricing and other outcomes in this market. Future studies will be easier to execute once information about consumer enrollment decisions has been released, and once the market is in longer-term equilibrium. These conditions will allow researchers to apply well-established supply-side methodologies to studying competition on the HIMs. Such research will permit more-nuanced conclusions and recommendations regarding the impact of competition and competition-related policies on various outcomes of interest. Given the large federal role in developing and regulating the

46 To obtain this estimate, we recalculated *2LPS* without CO-OPs in the sample of markets with a CO-OP and compared it to actual *2LPS*.

HIMs, and in subsidizing the purchase of plans offered on the HIMs, research on how competition affects consumer choice and insurer behavior is of critical importance.

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